

1 the second opposing surface of the layer of adhesive in substantially
2 vertical orientation, the fiber first portions terminating in tips above the
3 second opposing surface of the layer of adhesive; and

4 an encapsulant comprising a gel between the first portions of the
5 fibers and over the adhesive.
6

7 5. The thermally conductive structure of claim 4 wherein the
8 tips of the fibers extend to above the encapsulant.
9

10 6. The thermally conductive structure of claim 4 wherein the gel
11 comprises a polymer.
12

13 7. The thermally conductive structure of claim 4 wherein the
14 thermally conductive fibers are selected from the group consisting of
15 carbon fibers, metal fibers, and ceramic fibers.
16

17 8. The thermally conductive structure of claim 4 wherein the
18 thermally conductive fibers are selected from the group consisting of
19 graphite fibers and diamond fibers.
20

21 9. The thermally conductive structure of claim 4 wherein the
22 thermally conductive fibers are carbon fibers.
23

1 10. The thermally conductive structure of claim 4 wherein the
2 encapsulant is on the second opposing surface of the layer of adhesive.
3

4 11. The thermally conductive structure of claim 4 wherein the
5 fibers have second portions which extend downwardly to at or below the
6 first opposing surface of the layer of adhesive.
7

8 12. A thermally conductive structure, comprising:

9 a layer of adhesive having a pair of opposing surfaces, the
10 opposing surfaces being a first opposing surface and a second opposing
11 surface;

12 a plurality of thermally conductive fibers embedded in the adhesive,
13 the fibers having first portions which extend out of the second opposing
14 surface of the layer of adhesive and upwardly from the second opposing
15 surface, the first portions terminating in tips above the second opposing
16 surface of the layer of adhesive, the tips being at a same height above
17 the second opposing surface as one another; the thermally conductive
18 fibers being selected from the group consisting of carbon fibers, metal
19 fibers, and ceramic fibers; and

20 an encapsulant comprising a gel between the first portions of the
21 fibers and over the adhesive.
22
23

1 13. The thermally conductive structure of claim 12 wherein the
2 upwardly extending first portions are parallel to one another and
3 perpendicular to the second opposing surface.

4
5 14. The thermally conductive structure of claim 12 wherein the
6 thermally conductive fibers are carbon fibers.

7
8 15. The thermally conductive structure of claim 12 wherein the
9 tips of the fibers extend to above the encapsulant.

10
11 16. The thermally conductive structure of claim 12 wherein the
12 encapsulant is on the second opposing surface of the layer of adhesive.

13
14 17. The thermally conductive structure of claim 12 wherein the
15 fibers have second portions which extend downwardly to at or below the
16 first opposing surface of the layer of adhesive.

1 18. A thermally conductive structure, comprising:

2 a layer of adhesive having a pair of opposing surfaces, the
3 opposing surfaces being a first opposing surface and a second opposing
4 surface;

5 a plurality of thermally conductive fibers extending through the
6 adhesive, the fibers having first portions which extend out of the second
7 opposing surface of the layer of adhesive, the first portions extending
8 upwardly from the second surface, the upwardly extending first portions
9 being parallel to one another, the first portions terminating in tips above
10 the second opposing surface of the layer of adhesive, the fibers having
11 second portions which extend downwardly to at or below the first
12 opposing surface of the layer of adhesive; the thermally conductive fibers
13 being selected from the group consisting of carbon fibers, metal fibers,
14 and ceramic fibers; and

15 a gel encapsulant between the first portions of the fibers and on
16 the adhesive.

17
18 19. The thermally conductive structure of claim 18 wherein the
19 tips are at a same height above the second opposing surface as one
20 another.

21
22 20. The thermally conductive structure of claim 18 wherein the
23 thermally conductive fibers are carbon fibers.

- 1 21. A thermally conductive structure, comprising:
- 2 a substrate layer having a pair of opposing surfaces, the opposing
- 3 surfaces being a first opposing surface and a second opposing surface,
- 4 the first and second surfaces being spaced from one another along a
- 5 direction defined as a vertical direction;
- 6 a plurality of thermally conductive fibers embedded in the substrate
- 7 layer, the fibers having first portions which extend upwardly out of the
- 8 second opposing surface of the substrate layer in substantially vertical
- 9 orientation, the fiber first portions terminating in tips above the second
- 10 opposing surface of the substrate layer; and
- 11 an encapsulant between the first portions of the fibers and over
- 12 the substrate layer, the encapsulant at least temporarily adhering to the
- 13 first portions of the fibers.
- 14
- 15 22. The thermally conductive structure of claim 21 wherein the
- 16 tips of the fibers extend to above the encapsulant.
- 17
- 18 23. The thermally conductive structure of claim 21 wherein the
- 19 substrate layer is an adhesive.
- 20
- 21 24. The thermally conductive structure of claim 21 wherein the
- 22 thermally conductive fibers are carbon fibers.
- 23

1 25. The thermally conductive structure of claim 21 wherein the
2 encapsulant is a polymeric gel.

3
4 26. A thermally conductive structure, comprising:
5 a layer of adhesive having a pair of opposing surfaces, the
6 opposing surfaces being a first opposing surface and a second opposing
7 surface;

8 a plurality of flocked, thermally conductive fibers embedded in the
9 adhesive, the fibers having first portions which extend upwardly out of
10 the second opposing surface of the layer of adhesive in substantially
11 vertical orientation;

12 an encapsulant between the first portions of the fibers and over
13 the adhesive; and

14 a third surface defining an outermost surface of the thermally
15 conductive structure except for the fiber first portions terminating in tips
16 above the third surface and the encapsulant.

17
18 27. The thermally conductive structure of claim 26 wherein the
19 encapsulant comprises a polymeric gel.

20
21 28. The thermally conductive structure of claim 26 wherein the
22 third surface comprises a surface of the encapsulant.
23

1 29. The thermally conductive structure of claim 26 wherein the
2 thermally conductive fibers are carbon fibers.

3
4 30. The thermally conductive structure of claim 26 wherein the
5 fibers have second portions which extend downwardly to at or below the
6 first opposing surface of the layer of adhesive.

7
8 31. A thermally conductive structure, comprising:

9 a layer of adhesive having a pair of opposing surfaces, the
10 opposing surfaces being a first opposing surface and a second opposing
11 surface, the first and second surfaces being spaced from one another
12 along a direction defined as a vertical direction;

13 a plurality of flocked, thermally conductive fibers embedded in the
14 adhesive, the fibers having first portions which extend upwardly out of
15 the second opposing surface of the layer of adhesive in substantially
16 vertical orientation, the fiber first portions terminating in tips above the
17 second opposing surface of the layer of adhesive; and

18 an encapsulant comprising a gel over the adhesive, between the
19 first portions of the fibers, and beneath free tips of the fibers.